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Biomira Inc.'s diagnostic kits are used throughout the world to test for gastrointestinal, ovarian and breast cancer. Revenues from these kits and other sources of funding provide capital to cover R&D product development and clinical trial expenses.

Products Provide Revenue for Research

When laboratories around the world test for gastrointestinal, ovarian or breast cancer, many of them use diagnostic kits made by Edmonton's **Biomira Inc.** Its three products now on the market, Truquant GI™ Truquant OV™ and Truquant BR™, were developed by a team of Biomira scientists headed by vice-presidents Mike Longenecker and Tony Noujaim, who are also University of Alberta professors. A kit for prostate cancer diagnosis is under development.

Biomira's success with the kits stems from its unique synthetic antigen capability. The company identifies and synthesizes tumor-associated antigens and uses them to raise monoclonal antibodies, proteins that seek out and attach themselves to antigens. The antibodies, along with radioactive materials, enable doctors to determine the origin, type and stage of the cancer, and the rate it is invading healthy tissue.

"We emphasized 'in vitro' (test-tube) diagnostics first to build up a revenue stream. We're very much a research-oriented company with a healthy awareness of cash requirements," says Gordon Politeski, Biomira's president.

To fund R&D work, Biomira raised $9 million in venture capital through the Altamira Capital Corporation, Montreal. In 1987, the company's initial public share offering raised $15 million. Politeski says Biomira is actively seeking other sources of capital to cover heavy R&D product development and clinical trial costs.

Besides working on the 'in vitro' diagnostic kits, research on 'in vivo' (in the living body) methods of cancer diagnosis and a cancer vaccine are underway.

"Product opportunities that could result from this sort of research over the next decade are endless," says Politeski. "With over seven million new cases of cancer worldwide every year, Biomira's focus on developing diagnostic products is most encouraging." ¤

INSIDE

Biotechnology is a relatively new field – the first successful gene transplant took place in the early 1970s. Most of Alberta's biotechnology companies were formed after 1985; only one predates the '80s. Total employment is about 250 and aggregate sector revenues are estimated to be $20 million annually.

Last issue we dealt with the biotechnology industry in general, with emphasis on the universities' and the Alberta Research Council's role in this growing sector. This issue we explore some of the companies which make up a small but growing provincial biotechnology sector.

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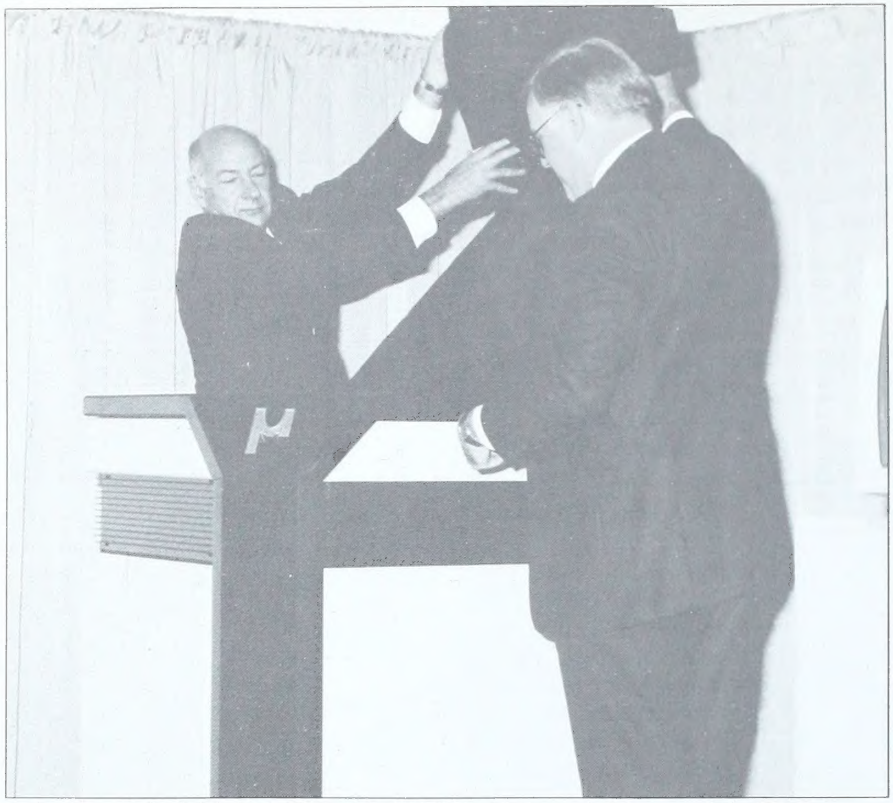

Les Young (left), Minister, TRT, and Ted White, Chairman, Myrias, unveil the SPS-2 supercomputer. Myrias also announced its first sales of its parallel processing systems, including a 128-processing system to the U.S. Department of Defense. (see page 6 for more Myrias news)

Consumer Demands Boost Agricultural Biotech

Compared to the hype over biotechnology used to make health care products, agricultural biotechnology has a low profile. Where there are close to 400 biotech companies in the health care field in North America, only about 40 companies specialize in agricultural biotechnology.

These figures don't bother Elson McDougald, president of Calgary-based **Biotechnica Canada Inc.**, western Canada's largest agricultural biotechnology company. Instead, he sees opportunities.

"The agricultural industry is facing difficulties at this time. Biotechnology can be used to produce new or value-added products which will increase the market return to farmers," he says.

"And the interest in agricultural biotechnology products is growing because consumers are demanding more natural foods which have not been treated by chemicals."

Two of Biotechnica's microbial products are "Super-Sile" and "Super-Hay". The products prevent spoilage in silage and hay and conserve nutrients; first year sales are expected to be near $1 million. Capitalizing on the success of these products, other microbial-based value added agricultural products are under development.

Biotechnica's other projects are aimed at producing high-quality oilseed crops with special emphasis on herbicide tolerance and production of hybrid varieties.

Collaborative research is also underway with the National Research Council, Australia's Commonwealth Scientific and Industrial Research Organization, and the RJR Nabisco Company.

"We're a start-up company and these strategic alliances are a necessity," Wells says. "They are the only way we can efficiently access scarce resources such as new technology, marketing expertise, manufacturing capability and distribution networks." ¤

"Nuggets of Gold" Found In University Laboratories

When University of Alberta professor Dr. Tom Wegmann started **Sci Can Diagnostics Ltd.**, he wanted to do "biotechnology with a difference".

"I didn't want to simply move university research and development to the private sector. I wanted to start out with real world-class products," he says.

That's exactly what Wegmann did. The products in Sci Can's first catalogue came from the laboratories of Wegmann's university colleagues. One of the items was a white cell separation device. It led to the development of an innovative line of products, Cell Passage Systems™, now used in immunology research throughout the world.

"There are little nuggets of gold like this in many university labs," says Wegmann. "Sci Can has created a venue for their exploitation."

Sci Can specializes in the research, manufacturing and distribution of medical diagnostic and research products that are less expensive and more effective than those currently available. Now on the market is a second product line, a new reader technology for ELISA, a standard immunological test used in research and clinical labs. Sci Can's product is approved for use in research labs and the company is seeking approval for clinical use.

Although Sci Can is a relative newcomer -- the company was founded in 1984 -- Wegmann says he is pleased at how "rapidly our products have caught on. We're marketing North America, Europe, Asia and Australia. Our products are selling at a great clip." ¤

National Research Council Opens Edmonton Office

The National Research Council has opened an Edmonton office for administering its Field Advisory Service in Alberta. Andrew E. Gilliland, provincial coordinator of NRC's Field Advisory Service, is located in the Alberta Research Council headquarters.¤

Denmark Finds Water Treatment Solution In Edmonton

At a major technical conference two years ago, companies from all over the world were looking for a solution to Denmark's contaminated water problem. They discovered that **Stanley Engineering Group** from Edmontone and Stanley's Western Canadian partners has the most advanced water treatment process.

"It was evident that things we'd done were clearly world class," says Ron Triffo, President of the Stanley Engineering Group.

The Danes first realized their water problems when dying lobsters and fish were being found in their coastal waters. Analysts determined algae had formed in the water and was stealing all the oxygen. The algae growth was caused by the presence of nitrates and phosphates. Nitrates and phosphates are inherent in the waste waters from industry, the agricultural sector and municipal waste water treatment plants. The Danes needed to remove these compounds, but if they used the conventional chemical removal methods, it would mean the waters would contain yet more chemicals, causing other environmental problems.

Stanley's water treatment process "biologically" removes the culprit compounds: the waste water is passed through tanks containing types of bacteria that "eat" the nitrates and phosphates. The Danes were so impressed that Stanley is now doing a major retrofit of the first of the municipal waste water plants in Denmark; and over a three year period, dozens more plants will need to be done. "It is a $5 billion project," states Triffo. Stanley has also been asked to look at developing the process for Denmark's fishing industry.

Stanley Engineering has specialized in the design of waste water treatment plants since the company started over 35 years ago. Before winning the Danish project, Stanley had been working on the process in British Columbia's inland water system and had a full scale plant in Penticton. "Stanley is the only company doing full scale plants," says Triffo.

The Danish contract has brought Stanley a lot of attention. Now the company is considering similar projects in Sweden, the Netherlands and Norway. The same algae problem is surfacing all over Western Europe.

"All countries in Western Europe are literally desperate for a solution to their waste water problems and the solution is here in Western Canada," explains Triffo. Stanley should be opening an office in Europe later this year.

The U.S. has also shown interest, and according to Triffo, phosphate and nitrate removal will become a requirement for waste water treatment right across Canada,. "Now that the world has an increased awareness of the environment, we're truly the right people at the right time," boasts Triffo.

Developing Stanley's technology involved years of practical research and ongoing enhancements and improvements to its process. "It is the evolution of a process," says Triffo. With true Canadian-style modesty, Stanley's people were surprised when they found out they were the best in the field, worldwide.

Triffo remarks, "Even we did not truly appreciate the significance of what we were doing."¤

Peptide Software Funds Research and Development

Ground-breaking research in peptide and protein engineering at the University of Alberta has spawned one of the province's newest biotech companies. Edmonton's **Synthetic Peptides Incorporated (SPI)** was established to commercialize the results of this fundamental research.

Peptides are naturally occurring substances; they regulate many bodily processes such as reproduction, pain, sleep and response to stress and infection. SPI is one of the first Canadian-owned and controlled pharmaceutical companies in the peptide field.

The company is developing peptide pharmaceuticals, diagnostics, and synthetic vaccines. "This is long-term work," explains Dr. Robert Hodges, SPI's president. "In this area, it takes a minimum of five years research and development before a product reaches clinical trials."

In the meantime, SPI has used its expertise in peptides to generate revenue to fund its R&D work. SPI provides custom peptide synthesis, identification, and purification services to international biotechnology and pharmaceutical companies.

SPI has also been able to market some of the spin-offs of its peptide research. The software it uses to design peptides has been sold to industries, research institutes and universities in North America and Europe. Two programs, SURFACEPLOT and PRODIGEST-LC, are now on the market and five others are under development.

"SPI's computer programs allow for a systematic approach to the design of peptides," says Hodges. "Our software replaces the trial and error approach to design and as a result saves time and money." ¤

Company Allows Market to Dictate Product Development

CHEMBIOMED Ltd., a biotechnology company located in Edmonton, is responding to the market's pressing demands for pharmaceuticals to treat AIDS and cancer by redirecting its research to focus on these two areas. For the immediate future, CHEMBIOMED will still concentrate on products for blood typing and for facilitating organ transplants, but for the long-term the company is shifting the emphasis of its research program.

"CHEMBIOMED is changing its R&D orientation to focus on major pharmaceutical markets," says Dr. Frank Unger, Vice President, Research and Development.

Alberta's first biotechnology company (1977) bases its technology on the landmark research of Alberta's Dr. Raymond Lemieux. Its unique technology involves blood group carbohydrate synthesis: chemically producing the sugar molecules that occur naturally on red blood cells. These chemically-produced sugar molecules can be used to remove the antibodies from the blood, which may interfere with treatments or organ transplants.

The company's original approach was to develop new carbohydrate synthesis technology in blood groups then turn it into products. But the market for blood-related products was too limited and specialized to sustain company growth. The company's new approach is to let the market dictate product needs, and to match those needs with new technology. As Unger puts it, CHEMBIOMED is now asking, "How can we respond with our technology to the market demand for products to treat diseases such as AIDS and cancer?"

CHEMBIOMED'S newly-directed research program starts at the fundamental research level, before a prototype product is even identified. "A company needs to engage in basic research - people tend to believe research is done in universities only, but the environment is very competitive and there is no guarantee that university researchers will come to CHEMBIOMED to commercialize a discovery," explains Unger. It may be two to three years before these new products move from the basic research stage to commercialization. Getting them on the market will also take time due to the required clinical trials and licencing process for pharmaceuticals.

One of CHEMBIOMED'S first products to the market might be a carbohydrate-based "adjuvant". An adjuvant enhances the immune system's response to vaccination and has potential for use in cancer therapy. Unger expects the first human applications within two years, "our product has already been tested in animals and a greatly enhanced immune response is seen."¤

New Technologies Keep Firm Ahead of the Herd

Calgary's **Alta Genetics Inc.** seems destined to be a record breaker. It began operation in 1986 as the successor company to Alberta Livestock Transplants Ltd., the first commercial embryo transfer firm in the world. In 1988, Alta Genetics merged with Western Breeders Service Ltd. to become a major genetic centre in western Canada and in the same year entered into the first agricultural joint venture between Canada and the USSR.

Countries like the USSR come to Alta Genetics for its elite livestock genetics and scientific expertise in high-tech cattle breeding.

"We have an elite donor herd of dairy and beef cattle that is recognized as one of the outstanding herds in North America," says Ted Mitenko, vice-president, Alta Genetics.

Because the company is at the leading edge of bovine embryological research and practice, its consulting services are also in great demand.

"In the export market, the ability to provide technical service is often the difference between making a sale and not making one," says Mitenko.

"International clients are becoming more and more important to our company. Almost every country is improving its livestock herds and, as a result, they need our services. At the moment, Australia is our biggest market. We ship several thousand embryos there every year."

As more embryo transfer companies come on the market, Alta Genetics is making sure it stays ahead of the pack by developing new technologies such as micromanipulation, cloning by nuclear transplantation, embryo sexing and genetic engineering.

"These new technologies are offshoots of our basic skills," says Mitenko. "They are capabilities that many other companies can't offer."¤

Conference

Artificial Intelligence and Real Health Care
May 11-12,1989
Edmonton, Alberta

The University of Alberta Hospitals, in association with the Faculty of Medicine, University of Alberta, is presenting this conference to explore AI systems as a means of enhancing diagnosis and treatment, facilitating health care professionals' involvement in AI applications through education, exploring new areas for AI research in health care and examining implications of AI on the health care system.

Contact:
AI Conference
University of Alberta Hospitals
8440 - 112 Street, Room 1J2
Edmonton, Alberta
T6G 2B7¤

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Don Evarts (left), President, ITT Barton; Pat Harding (centre), President, Harding Instruments; and Ken Broadfoot, Deputy Minister, TRT, discuss the terms of the agreement signed between Barton ITT and Harding during a tour of Harding's facilities.

Harding /ITT Barton Sign Product Agreement

Harding Instruments of Edmonton and **ITT Barton Instruments** of California have signed an agreement covering the development, production and marketing of a line of oilfield flow computers. This product, called the Scanner Series, has been under development at Harding Instruments for several years. The terms of the agreement call for ITT Barton to contribute over $500,000 during the coming year towards the expansion and enhancement of the product line in return for worldwide marketing rights. All R&D and production will be done in Canada by Harding Instruments.

ITT Barton is a US company based in Los Angeles with a Canadian subsidiary located in Calgary and is a major supplier of oil field instrumentation in Canada and the USA.

Harding Instruments is a local Edmonton company which specializes in the development and production of microelectronic-based products. The company presently employs 20 people and plans to double that number over the next two years.¤

International Praise For TRT Video

"**High on Technology**" has received a Gold Medal in the Public Relations Category at the 1988 International Film and TV Festival of New York. The video was awarded the medal over productions from Portage, Maine and the Government of Ontario. It was the only gold medal awarded to any Canadian organization in the 31st competition of the festival.

For copies of the video or more information, contact Wayne Telfer, TRT, 12th Floor Pacific Plaza, 10909 - Jasper Avenue, Edmonton, Alberta, T5J 3M8, (403) 422-0567.¤

New Executive Slate for Electronic Association

The Executive of the Electronic Industry Association of Alberta for 1988-89 is:

President - Richard Paquette, Gold Medal Group Inc.
Vice-President - Dale Alsopp, Alberta LASER Institute
Secretary/Treasurer - Dave Schuh, Beta Machinery Analysis Ltd.¤

Alberta Government Trade Show Calendar

Look for the Alberta Government at the following trade shows in 1989.

Companies wishing to participate with the Government in any of these trade shows should contact John Tansowny, Director of Investment Promotion, TRT, (403) 422-0567, for details and more information.

Electro '89 - New York - April 11-13
Flanders Technology International - Ghent, Belgium - April 24 to May 1
American Society of Microbiology Conference and Exhibition - New Orleans - May 15-17
WorldTech '89 - New York - June 28-30
Canadian High Technology Show - Toronto - October 18-19
Wescon '89 - San Francisco - November 13-15¤

Medical Innovation Program Announced

The Alberta Government recently announced a major new initiative aimed at commercializing the results of medical research conducted in Alberta.

The **Alberta Medical Innovation Program** will provide $9.3 million over five years to Alberta businesses and entreprenuers to support prototype development, testing, and clinical trials of promising new drugs and devices. The $9.3 million will be in addition to funds provided for the technology transfer program of the Alberta Heritage Foundation for Medical Research (AHFMR).

The Medical Innovation Program will be administered by the AHFMR in consultation with Alberta Technology, Research and Telecommunications. This program is supported with the transfer of payments to Alberta from the Government of Canada under the amended Patent Act, and by funds contributed by the AHFMR. Alberta is to receive approximately $2.3 million per year for four years under the Patent Act provisions.

Futher details on the program are available from TRT or AHFMR.¤

Myrias Receives $7.5 Million to Build Supercomputer

The Government of Alberta will provide a $7.5 million loan to **Myrias Research Corporation** of Edmonton to build a very large model of its SPS-2 Parallel Supercomputer for demonstration purposes.

Myrias will use the supercomputer to demonstrate the capabilities of its system and associated software to potential customers. The supercomputer will also be made available for use by the Alberta Research Council and the Universities of Alberta and Calgary to work on various scientific and technical problems relevant to Alberta.

Les Young, Minister of Technology, Research and Telecommunications, said the Myrias supercomputer has attracted international attention and holds significant potential for Alberta.

"The Alberta Research Council and the two major universities in Alberta have been anxious to use the Myrias supercomputer for a variety of problems," said Young. "Among other applications, the Myrias supercomputer can be used for oil reservoir modelling and seismic signal processing in the petroleum industry; for medical imaging and research problems; for biotechnology development; and for solving problems in the telecommunications industry."

Myrias unveiled the SPS-2 family of supercomputers in November, 1988, and recently announced its first order for a 128-processor installation early in the second quarter of 1989.

The supercomputer to be built by Myrias with the Alberta Government loan will be much larger - utilizing 1,024 microprocessors, which together will have four gigabytes of memory.

"This investment will allow Myrias to demonstrate, on a very large system, the performance and ease of use of our Parallel Application Management System," said Peter Gregory, President of Myrias. By having that demonstration capability, Myrias hopes to meet early success in its worldwide marketing efforts.

Myrias expects to have a 512-processor SPS-2 system completed by May of 1989, with the full 1,024 processor configuration available by the summer. Myrias will invite prospective customers to test the system's operation and compare Myrias software with existing software and systems.

Myrias Research Corporation is headquartered in Edmonton. A wholly-owned subsidiary, Myrias Computer Corporation, is located in Boston, Massachusetts, and is responsible for worldwide sales, marketing and service.¤

Tech-Bits

New Board Members Appointed — Four new members were recently appointed to the Alberta Research Council's Board of Directors. They are: **Dr. Robert B. Church**, professor, Medical Biochemistry, Faculty of Medicine, University of Calgary; **Dr. Renee Elio**, assistant professor, Department of Computing Science, University of Alberta; **H. MacKenzie Millar**, vice-president and secretary-treasurer, Millar Western Industries Ltd., and president of Millar Western Pulp Ltd.; and **Dr. D. Robert Weir**, general manager, Technology, Sherritt Gordon Limited.

C-FER President and Board Appointments — **Dr. Touraj Nasseri** has been appointed President of the Centre for Frontier Engineering Research (C-FER) effective March 1, 1989. Dr. Nasseri has been with Det norske Veritas (Canada) Ltd. for the past six years, most recently as President and Director of its Centre for Cold Climate Technology Research.

Gary Bruce, Petro-Canada Resources; **Milan Kosanovich**, IPSCO Inc.; and **Glen Russell**, Gulf Canada Resources Limited, have been appointed to the C-FER Board of Directors.

Telecommunications Research Awards — The Alberta Telecommunications Research Centre (ATRC) is again offering scholarships and financial awards for graduate students wishing to pursue graduate and/or postdoctoral studies in Telecommunications.

The three major awards are:

Dr. Gordin Kaplan Postdoctoral ATRC Fellowship - $20,000.

ATRC Telecommunications Research Scholarship - $12,000 per year for students not receiving another major award.

ATRC Telecommunications Research Fellowship - $6,000 per year for students receiving another major award.

Awards are made on the basis of academic performance and on the relevance of graduate/post doctoral proposals to the ATRC Research Program. Awards are renewable after one year on the basis of performance. Research work must be carried out on ATRC premises. The number of awards is determined by the funding available and the number of candidates.

For more information about ATRC, eligibility, application procedures and deadlines write:
Chairman,
Scholarship Committee, Alberta Telecommunications Research Centre, 200, 4245 - 97 Street,
Edmonton, Alberta, T6E 5Y4.¤

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